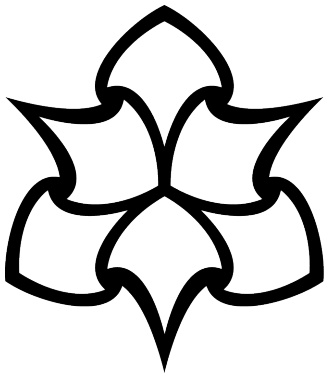

CHANGES IN SPRINT AND JUMP HEIGHT DURING AN ACADEMIC YEAR IN HIGH SCHOOL ADOLESCENT AND YOUTH SPORT ATHLETES

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1.0 – Introduction

- Lower limb power and sprinting ability are fundamental attributes for successful sports performance and a key performance assessment in many testing batteries and talent identification assessments.[1]
- Improvements in these measures following a strength and conditioning intervention have been found in youth and adolescent populations.[2, 3]
- Such measures are yet to be assessed over the course of an academic year and as such it is unknown how attributes annually.

2.0 – Methods

- Sixty-five high school athletes (45 male, 20 female) (17.3 ± 0.6 yrs, body mass 73.3 ± 13.5 kg, height 175.1 ± 9 cm) participated in the study.
- Countermovement jump (CMJ) height and 10 and 20 m sprint times were measured at the start, middle and end of the academic year (September, December and May).
- The best score from 3 attempts for each test was recorded.
- A linear mixed model was used to assess changes in physical qualities over time. Time was added as a fixed effect and participant was added as a random effect. Magnitude based inferences and Cohen's *d* effect sizes (ES) were used to determine practical significance.

3.0 – Results

- CMJ showed an *almost certain* improvement between September and December, and *likely* improvement between December to May.
- *Almost certain* improvements in 10m sprint time were observed between September and December, and *possible* improvements between December and May.
- Between September to December there was a *possible* improvement in 20m time and from December to May.

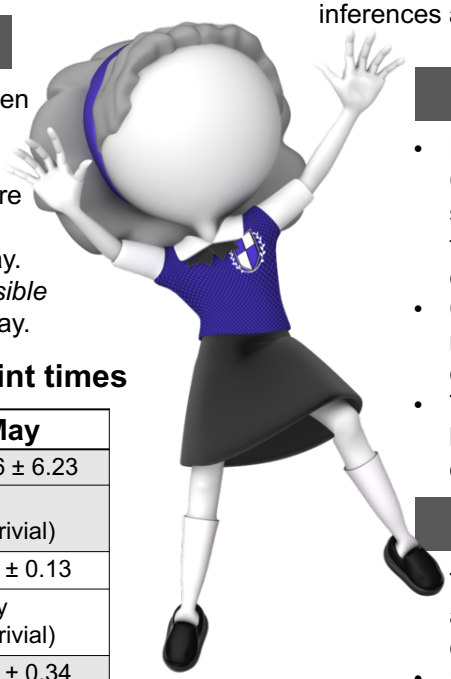
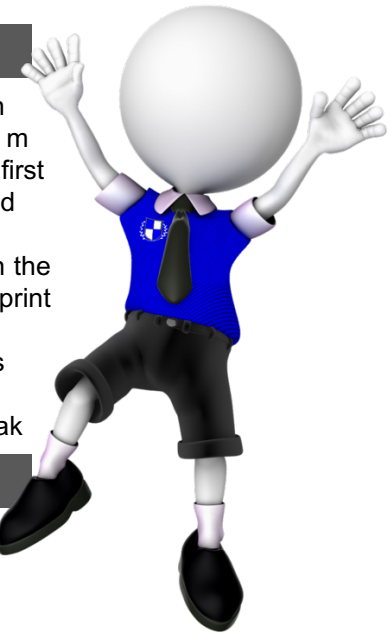


Table 1. Seasonal changes in CMJ and sprint times

	September	December	May
CMJ height (cm)	31.11 ± 6.14	33.82 ± 6.56	34.56 ± 6.23
	Almost certainly (ES=0.78; Moderate)		Likely (ES=0.01; Trivial)
10 m sprint (sec)	1.86 ± 0.11	1.79 ± 0.08	1.78 ± 0.13
	Almost certainly (ES=0.76; Moderate)		Possibly (ES=0.07; Trivial)
20 m sprint (sec)	3.24 ± 0.31	3.16 ± 0.16	3.07 ± 0.34
	Possibly (ES=0.40; Small)		Possibly (ES=0.25; Small)

4.0 – Conclusions

- High school athletes experience moderate improvements in CMJ height and 10 m sprint, and small improvements in 20 m sprint at the start of the academic year. This is typically the first time these athletes are exposed to a structured strength and conditioning program following a rest period.
- Changes in CMJ height and 10 m sprint are trivial between the middle and end of the academic year, whereas 20 m sprint continues to improve (small change).
- This may be due to either an inappropriate training stimulus limiting development of CMJ and 10 m, or a plateau in development of explosive qualities prior to the summer break



5.0 – Practical Applications

- This study provides reference change data for high school athletes in speed and jump height which can be used for comparison by strength and conditioning coaches.
- Strength and conditioning coaches should monitor the appropriateness of specific training stimuli to facilitate adaptation and development in youth athletes across a range of physical qualities.

Acknowledgments

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6.0 – References

[1]Lubans et al. (2010) Fundamental movement skills in children and adolescents: Sport Med 40:
[2]Radnor. J, et al (2016) Individual response to different forms of resistance training in school-aged boys. Journal of Strength and Conditioning Research. 31(3)
[3]Hopper et al, 2017 Neuromuscular Training Improves Movement Competency and Physical Performance Measures in 11-13-Year-Old Female Netball Athletes. J Strength Cond Res. 31(5)